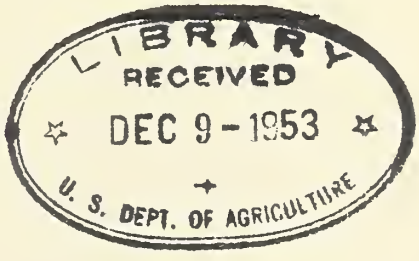
C A L I F O R N I A 4 1 A N Z A

FIELD APPRAISAL ANALYSIS

Prepared by
Economic Analysis Section
Electric Operations and Loans Division
RURAL ELECTRIFICATION ADMINISTRATION



Field Appraisal
Completed in
September 1953

****
****
***
*

October 30, 1953

Economic Analysis Section
Electric Operations and Loans Division

SUMMARY AND CONCLUSION
CALIFORNIA 41 ANZA
(Reappraisal)

AREA CHARACTERISTICS

The area to be served initally by the proposed system is a small section of Riverside County in the southern part of California. The altitude varies from 4,000 to 5,000 feet, the rainfall averages 13 inches annually, and the growing season averages 165 days. An attractive feature is the climate. The nights are cool in the summer and the winters are not severe. It is close to the desert country and is used as a retreat from the heat.

Poultry for fryers is new in the area. Irrigation from drilled wells should improve the agriculturally diversified economy including permanent pastures, alfalfa, small grains, potatoes and vegetables. Marketing, transportation, and credit facilities appear to be adequate.

ULTIMATE NUMBER OF CONSUMERS

The proposed system has signed applications for 361 services. It expects to increase this number to 1,196 in 10 years after energization. If the past trend continues in the number of farm, nonfarm residential, and seasonal consumers, it is reasonable to expect the number of consumers, as stated by the cooperative, to be achieved with the exception of irrigation. It is estimated a total of 30 irrigated farms will be the ultimate.

ESTIMATED FUTURE CONSUMPTION OF ELECTRICITY

Farmers indicated an average monthly usage of 877 kwh to be attained 3 years after energization. Nonfarm residential consumers indicated an average of 426 kwh to be attained over the same period. Seasonal consumers indicated an annual average of 1,285 kwh. Use of electricity for irrigation was indicated to be 996 kwh per acre irrigated. Small commercial consumers indicated an average of 912 kwh to be attained in the 3 years. Practically all consumers had 110 volt electric plants, and they indicated that most of the appliances they now have in their possession would be brought on the system's lines upon energization. For this reason a relatively large initial usage might be expected. Two-thirds of the farm and one-half of the nonfarm residential consumers using LP gas indicated they would transfer to electricity within 3 years.

Based on the random sample of potential consumers and other factors believed to be significant, this analysis leads to the following estimates, which are certified as being reasonable and may be expected to be attained at periods following energization as specified.

Class of Consumer	Average Monthly KWH to be Attained Following Energization		
	In 2 Yrs.	In 5 Yrs.	In 10 Yrs.
Farm	600	725	900
Nonfarm Residential	200	260	350
Seasonal	70	80	100
Small Commercial	650	750	900
Public Buildings	40	50	60
Street Lights (annual)	4,000	4,500	4,500
Irrigation (annual)*	80,000(50HP)	80,000(50HP)	80,000(50HP)
Large Commercial (annual)			
Camp Roosevelt	87,000(50kw)	110,000(65kw)	130,000(75kw)
Dolomite Mine	85,000(100kw)	85,000(100kw)	85,000(100kw)

*Per irrigated farm with an average of 80 acres (1,000 kwh per acre).

Richard G. Schmitt, Jr.
Head, Economic Analysis Section
Electric Operations and Loans Division

October 30, 1953

Economic Analysis Section
Electric Operations and Loans Division

ANALYSIS OF BASIC FACTORS RELATED TO THE RURAL ELECTRIFICATION LOAN FOR CALIFORNIA 41 ANZA
(Reappraisal)

This analysis of basic factors related to the probable future consumption of electricity for the Anza Electric Cooperative, Incorporated, at Anza, California, is based on a field study and analysis by Earl A. Gardner, Agricultural Economist, Economic Analysis Section, during the period September 10 to 25, 1953.

The original appraisal was completed for this system in May 1951. Both appraisals are prior to the energization of the system.

The field work for the present appraisal consisted primarily of interviews with 116 farm, nonfarm, seasonal, and potential commercial consumers of electricity.1/ In addition to securing intentions to consume electricity, data were secured from local businessmen and agricultural leaders, relating to the probable future consumption of electric power in the area.

PHYSICAL CHARACTERISTICS

The project area of this cooperative is located in the southern part of the State of California and consists of a small part of Riverside County. It lies in a mountainous section of the Sierra-Nevada Range, at an altitude varying from 4,000 to 5,000 feet. The farm land lies in the valleys of the mountain ranges. The soil in these valleys is a rich sandy loam suitable for growing of alfalfa, small grains, potatoes, certain vegetables, hay, and pasture. The soils on the mountain slopes are rocky and suitable only for grazing or raising chickens.

The rainfall averages 13 inches annually with a growing season of 165 days on the average. Most of the rainfall occurs during winter months. One of the attractive features of the area is the climate. The nights are cool in the summer and the winters are not severe. The air is clear, while in the Los Angeles area fog and smog prevail. People tend to make this area a retreat from the heat, fog, and smog. This encourages them to live in the service area upon retirement.

ECONOMIC CHARACTERISTICS

The economic conditions of the area are going through a period of substantial change. Since the previous appraisal, a number of farms have added wells for irrigation and are increasing their production per acre of "Ranger" alfalfa seed. Irrigation of pasture lands is increasing the carrying capacity per acre.

Several poultry men now live in the area and this year are marketing an estimated 200,000 fryers. Interviews with farmers indicated a substantial increase in the number of fryers during the next 3 years. With California producing only one-eighth of its demand for chickens and the proximity of markets, this appears to be a desirable move.

1/ Random sample from tabular list.

One 40-acre field of potatoes being grown on irrigated land was nearly matured. From a field check it was estimated to yield 350 one-hundred pound sacks per acre. The ownership of one large vegetable farm plans to grow lettuce. It is planned for this lettuce to mature at a time during the year when there is little maturing in the lower valleys.

Los Angeles has increased in population from 1.5 million in 1940 to almost 4 million in 1950. Riverside County has increased its population 13 percent during the same period. Local people have anticipated an increase of 90,000 persons over the next 10 years. This is twice the number now living there.

Riverside County increased its number of chickens sold in 1949 to 1,230,825, as compared with the 1945 Census of Agriculture figure of 1,008,919. The county ranked 64th in the United States in 1949 in poultry production. It ranked 30th in the acreage in vegetables in the United States in 1949 and 8th in dollar income from fruits during the same period.

At present there are no banks in the service area. Banking is carried on at Hemit and two other neighboring towns. These banks held loans to agriculture of 3 million dollars, compared to 4 million of deposits including 2½ million in savings and time deposits.

A discussion with the leader of the Cahuilla Indians, who is also a board member of the cooperative, indicated a possibility of the tribal lands being returned to private ownership; but he did not expect this to occur within the next 5 years, if at all. There has been only one case, which occurred in New York State, of such dissolution of tribal lands to date.

ULTIMATE NUMBER OF CONSUMERS

Since the original appraisal, a portion of the area has been deleted by the California State Public Power Commission. The 84 signed and prospective consumers deleted from the original list of 350 members in the loan request have been replaced by new consumers moving into the present boundaries of the cooperative.

It was indicated in the appraisal that several prospective consumers had signed for membership and would build homes in the area as soon as power was available. This was confirmed verbally by them or by their "neighbors to be."

The ultimate number of consumers indicated by the manager in the next 10 years appears to be reasonable in light of the recent increases in the agricultural, nonfarm, seasonal, and small commercial consumers in the area (Figure 1). The manager's estimates for the number of irrigation pumps translated into the number of farms from the appraisal indicate 22 farms planning on irrigation in 3 years. In several cases more than one well would be located on a farm with varying number of gallons per minute produced by different wells. The appraiser estimates 30 farms with irrigation in 10 years. The first irrigation from wells occurred approximately 5 years ago.

Seasonal Consumers

There are two major centers of population for seasonal consumers with a few others scattered throughout the service area. Many of the seasonal consumers indicated they

will be nonfarm residential consumers in the next 3 to 5 years. There are 52 homes in the Pinion Flats area at the present time and all desire central station service. According to one of the directors of the cooperative who has been developing this area, the number of lots available will allow for doubling the present number of potential consumers. People spend vacations and weekends at their summer homes in this area to escape the heat. Thirty minutes' driving time by car from Desert Palms takes one from below sea level to 4,000 feet elevation. A one-hour drive brings in other seasonals from Indio and Palm Springs. Homes in this area are modest. However, seasonals living at Mountain View or Thomas Mountain have more elaborate summer homes and cottages. This area is about 10 miles beyond Pinion Flats. At present there are 55 homes here and 15 more lots are available. Expansion is limited since the Forest Service lands surround most of the area and the Garner Ranch completes this enclosure. The major additional seasonal growth is expected to be in other sections of the system area. The Aguanga and Hemit area described in the previous analysis has been deleted from the present system area.

Unserved Areas

The reappraisal confirms the limited opportunity to expand to new unserved areas that was shown by the original appraisal. There are private power lines to the east and west, with mountain ranges to the north and south.

NATURE OF INDICATED KWH CONSUMPTION

The following distribution of indicated future use of electricity by usage group should assist in developing a rate schedule for this system.

KWH Consumption Group	Percent of Farm Consumers	Percent of Nonfarm Residential Consumers
Less than 100	—	13
100 - 199	10	7
200 - 299	13	16
300 - 399	3	6
400 - 499	13	19
500 - 599	13	23
600 and over	47	16

The increase in the percent of farm consumers planning to use over 600 kwh per month in relation to the previous appraisal is due largely to the use of electricity for brooding chickens. These averages will be attained after the consumers acquire all the electrical appliances and equipment they state they plan to acquire within 3 years after central station service is made available to them. The respondents' indications as to use of appliances in 3 years are shown in the following table.

TABLE I

PRESENT AND INDICATED SATURATION OF ELECTRICAL APPLIANCES AND EQUIPMENT AND CORRESPONDING INDICATED INCREASE IN KWH USAGE FARM AND NONFARM RESIDENTIAL CONSUMERS

Appliance or Equipment	Farm Consumers		Nonfarm Consumers	
	Saturation (percent)	Total KWH[a] Requirement Per 100 Cons.	Saturation (percent)	Total KWH[a] Requirement Per 100 Cons.
Air Conditioning Unit	3	6,600	—	—
Air Compressor	50	1,750	23	791
Animal Clipper	13	40	—	—
Battery Charger	23	280	10	116
Blanket	23	3,495	39	5,805
Blower (Chicken House)	3	167	—	—
Branding Iron	3	7	—	—
Broiler	10	500	6	325
Brooder (Infrared)	10	289,330	—	—
Brooder (Hover)	27	107,895	6	24,102
Churn	7	20	—	—
Clock	77	1,620	68	1,568
Clothes Drier	20	14,000	10	6,790
Concrete Mixer	13	332	3	16
Cream Separator	3	116	—	—
Debeaker	3	7	—	—
Dishwasher	13	399	—	—
Drill Press	87	1,080	39	464
Egg Cleaner (Dry Type)	7	2,774	—	—
Egg Cooler	3	82	—	—
Elevator (Rough)	3	16	—	—
Evaporative Cooler	40	3,118	16	1,159
Fan (Cent. Hot Air Cir.)	7	1,608	—	—
Fan (Exhaust)	13	200	13	194
Fan (Household)	60	950	45	822
Feed Chopper	10	120	3	38
Feed Grinder	3	495	—	—
Feed Mixer	3	40	—	—
Fence	37	2,000	6	325
Fly Catcher	3	7	—	—
Food Mixer	80	2,082	77	1,935
Freezer (Home)	80	72,000	61	55,170
Garbage Disposal	3	50	—	—
Garden Watering	50	3,750	23	1,695
Hair Clippers	7	13	—	—
Heating Pad	33	110	42	126
Honey Extractor	3	16	—	—
Hot Bed	3	792	3	768
Hot Plate	27	1,869	6	455
Incubator	7	536	—	—

Appliance or Equipment	Farm Consumers		Nonfarm Consumers	
	Saturation (percent)	Total KWH[a] Requirement Per 100 Cons.	Saturation (percent)	Total KWH[a] Requirement Per 100 Cons.
Iron	100	10,670	94	9,360
Ironer (Mangle)	23	2,796	16	1,932
Lathe	13	200	10	116
Lighting: Spring House	—	—	6	33
Dairy Barn	10	350	—	—
Garage	33	266	52	413
General Barn	60	1,440	29	696
Grain & Feed Storage Building	7	13	—	—
House Lighting	100	25,608	100	24,000
Milk House	3	116	—	—
Other Buildings	23	320	25	408
Poultry Brooder House	27	150	3	16
Poultry Laying House	33	1,634	3	112
Shop	37	440	13	155
Yard	73	3,361	68	1,219
Livestock Watering	63	11,394	10	1,746
Milk Cooler	3	6,765	—	—
Milk Pasteurizer	—	—	3	384
Milking Machine	7	1,514	—	—
Movie Projector 8 mm.	7	47	3	22
Oil Furnace	3	990	3	960
Percolator	60	3,798	74	4,842
Polisher	—	—	3	48
Poultry Feeder	7	2,400	—	—
Power Saw	77	960	42	658
Pressure System (Less than 22')	3	594	—	—
Pressure System (Greater than 22')	83	21,600	48	14,712
Radio	97	12,000	97	10,000
Range	70	87,960	45	58,080
Razor	3	3	—	—
Refrigerator	70	26,388	55	23,220
Refrigerator (Walk-in)	17	25,050	3	4,800
Roaster	37	17,616	13	6,192
Sander	7	80	3	38
Sewing Machine	57	567	74	742
Soil Sterilizer	—	—	3	96
Soldering Iron	60	900	36	533
Space Heater (Portable)	50	6,069	42	3,388
Stationary Sprayer	3	1,650	—	—
Sprayer	—	—	3	38
Stock Tank Heater	3	495	—	—
Tea Kettle	—	—	3	480
Television Receiver	80	29,988	77	27,864
Toaster	97	3,500	90	3,161
Tool Grinder	77	2,000	29	725
Upholstery Equipment	3	40	—	—

Appliance or Equipment	Farm Consumers: Saturation (percent)	Farm Consumers: Total KWH[a] Requirement Per 100 Cons.	Nonfarm Consumers: Saturation (percent)	Nonfarm Consumers: Total KWH[a] Requirement Per 100 Cons
Vacuum Cleaner	80	1,734	77	1,548
Ventilator (Window)	--	--	1	160
Waffle Iron	93	2,332	77	1,935
Washing Machine	100	3,734	94	3,277
Water Heater with Bath	67	210,000	61	203,100
Water Heater without Bath	--	--	3	7,680
Water Warmer	3	198	--	--
Welder	30	2,250	10	728
Wood Saw	20	600	3	96
Woodworking Tools	3	480	--	--

a/ Based on average energy requirements determined by REA. Data do not reflect instances where more than one of the same appliance exists per consumer.

TABLE II

INDICATED KWH USAGE, FARM CONSUMERS, 1956

Use	Saturation	KWH Per 100 Consumers	Percent of Total
Major Household Uses			
Water Heater	67	210,000	20.0
Range	70	87,960	8.4
Home Freezer	80	72,000	6.8
Television Receiver	80	29,988	2.8
Refrigerator	70	26,388	2.5
House Lighting	100	25,608	2.4
Walk-in Refrigerator	17	25,050	2.4
Pressure System	86	22,194	2.1
Major Farm Uses			
Brooder (Infrared)	10	289,330	27.4
Brooder (Hover)	27	107,895	10.3
Livestock Watering	63	11,394	1.1
Miscellaneous	--	145,519	13.8
Total		1,053,326	100.0

Nearly 39 percent of the total kwh planned for use by the farm consumers is to be used in agricultural production.

TABLE III

INDICATED KWH USAGE, NONFARM RESIDENTIAL CONSUMERS, 1956

Use	Saturation	KWH Per 100 Consumers	Percent of Total
Major Household Uses			
Water Heating	61	203,100	38.9
Range	45	58,080	11.1
Home Freezer	61	55,170	10.6
Television Receiver	77	27,864	5.3
House Lighting	100	24,000	4.6
Refrigerator	55	23,220	4.4
Miscellaneous	—	130,943	25.1
Total		522,377	100.0

USE OF BUTANE GAS

The survey revealed that 87 percent of the farm and 84 percent of the nonfarm residential consumers were using butane gas for one or more purposes. The response with respect to transferring to electricity when central station service is made available was two-thirds of farm and about one-half the nonfarm residential consumers at the time of the appraisal. Reasons indicated by those not desiring to transfer over to electricity were:

1. "I have a new stove (or refrigerator) and feel I would not get much of a trade-in so will use until it is worn out."
2. "After I am convinced there will not be many outages, I will consider going all electric."
3. "I like my Servel refrigerator and would not care to change to an electric refrigerator."

Farm consumers not using gas indicated no intentions to do so, while 3 percent of the nonfarm residential consumers indicated they were planning on using gas for cooking and refrigeration. A program of member education at the beginning could aid considerably in the replacement of gas appliances and equipment.

TABLE IV

STATUS OF BUTANE GAS IN AREA

Consumers' Position With Respect to Use of Butane Gas	Number	Percent of Total	Number Planning to Change When Electricity is Available
Not Using and Not Planning to Use	8	13.1	
Not Using but Planning to Use	1	1.6	
Presently Using	52	85.3	
Cooking	50		26
Water Heating	36		22
Refrigerators	46		25
House Heating	15		7
Chick Brooding	6	100.0	2

There is a substantial increase in the number of consumers planning on changing over their appliances and equipment to electric since the previous appraisal.

House Heating with Electricity

One-fourth of the respondents interviewed indicated they were using Butane gas for heating their homes. Twenty-eight percent of these indicated they would heat with electricity if the rates were equal to or less than the present costs. Only two respondents indicated panel heating; the remainder would use portable heaters. The winter season is normally short and not too many days would require artificial heat other than for short periods during the day.

IRRIGATION

At the time of the survey, there were 22 farms either irrigating or planning on irrigating within 3 years. The source is from wells tapping underground water. There is one area adjacent to Anza where most of the underground water seems to prevail. A few other wells are producing water in a quantity sufficient to irrigate within the service area, however, it is not expected the total number of farms to be irrigated ultimately to exceed 30. Those interviewed who are believed to constitude all who are now irrigating and those planning to drill wells aggregate 3,650 acres. Seventy-eight percent of this acreage is planned to be irrigated by sprinkler systems. The crops to be irrigated include pasture, alfalfa, grain, potatoes and vegetables. A study of the available water from the wells versus the amount of water expected to be applied throughout the year indicates that farmers are over optimistic about what they can do with the amount of available water from their wells. Based on normal crop water requirements, it can be assumed that approximately 2,000 acres are all that can be properly irrigated. Those interviewed expressed the desire to pump the water from the wells and operate their sprinkler systems with electric motors. The acreage under gravity flow would use electric motors to pump the water from the wells. The average lift from water level during pumping to the highest point of water elevation is 100 feet. The average requirement per irrigated acre per season is estimated at 996 kwh.

Those irrigating at present are using either butane gas or gasoline to power their motors. All are willing to change to electric motors, providing the cost of electricity is equal to or less than their present fuel costs.

COMMERCIAL CONSUMERS

Small Commercial Consumers

The number of small commercial consumers signed was six and public buildings five at the time of the appraisal. Until a year ago the main highway artery through this area was a dirt road. This has since been oiled and the amount of travel has increased. It was noted that interstate bus service has started to travel this road. Increase in travel on this road plus the increased number of farm and nonfarm residential consumers will likely increase the number of small commercials.

Large Power Consumers

Camp Roosevelt located at Mountain Center is a summer camp for boys and girls. It has had a steady growth and this year 150 young folk occupied the camp during July and August. It was indicated that other groups would like to use the camp before and after the regular season. This camp is a definite prospect for electricity when it is available. Another potential user is a dolomite mine, however, it will require expensive line construction to reach.

Based on all factors considered in this study of the service area, the addition of central station service may:

1. Increase the number of consumers in the area.
2. Contribute to increased poultry production.
3. Provide more diversification of crop production and increased income to the area.
4. Improve the living conditions of consumers.
5. Improve the cattle units by producing more hay and permanent pasture to precipitate economy of the units.

Based on the interviews with the potential consumers in the service area in relation to REA standards for the use of electricity, the unserved farm consumers would in 3 years after energization use an average of 877 kwh monthly, the nonfarm residential consumers 436 kwh monthly, and the seasonal consumers 1,285 kwh annually or 107 kwh monthly.

Farm consumers in a neighboring cooperative averaged 581 kwh per month during the past 12 months using a smaller percent for production.

Eighty percent of the farm, 87 percent of the nonfarm residential and 84 percent of the seasonal consumers are at the present time using electricity produced by their home electric plants within the service area. The appraiser estimates between two-thirds and three-fourths of the electric appliances are already in use that were indicated to be in use within 3 years. The major changes that will be necessary are in ranges and refrigerators which now require butane gas. Several residents not now using home electric plants indicated they had their appliances in the city and would move them into the area as soon as central station service was available.

The nonfarm residential and seasonal consumers are retired people who are moving from the cities, or businessmen who appear to be financially able to buy whatever electrical appliances they need for their homes. The financial position of the farm consumers appears to be sound. One bank was desirous of increasing the number of loans in this area. The ability of a large majority of the consumers to purchase the indicated appliances within 3 years appeared favorable.